DELTA CONSERVANCY

May 28, 2014

DROUGHT PREPAREDNESS & RESPONSE

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Department of Water Resources

PUBLIC SAFETY ENVIRONMENTAL STEWARDSHIP ECONOMIC STABILITY

Today's Water Management Challenge: A Tale of Two Extremes

TOO LITTLE

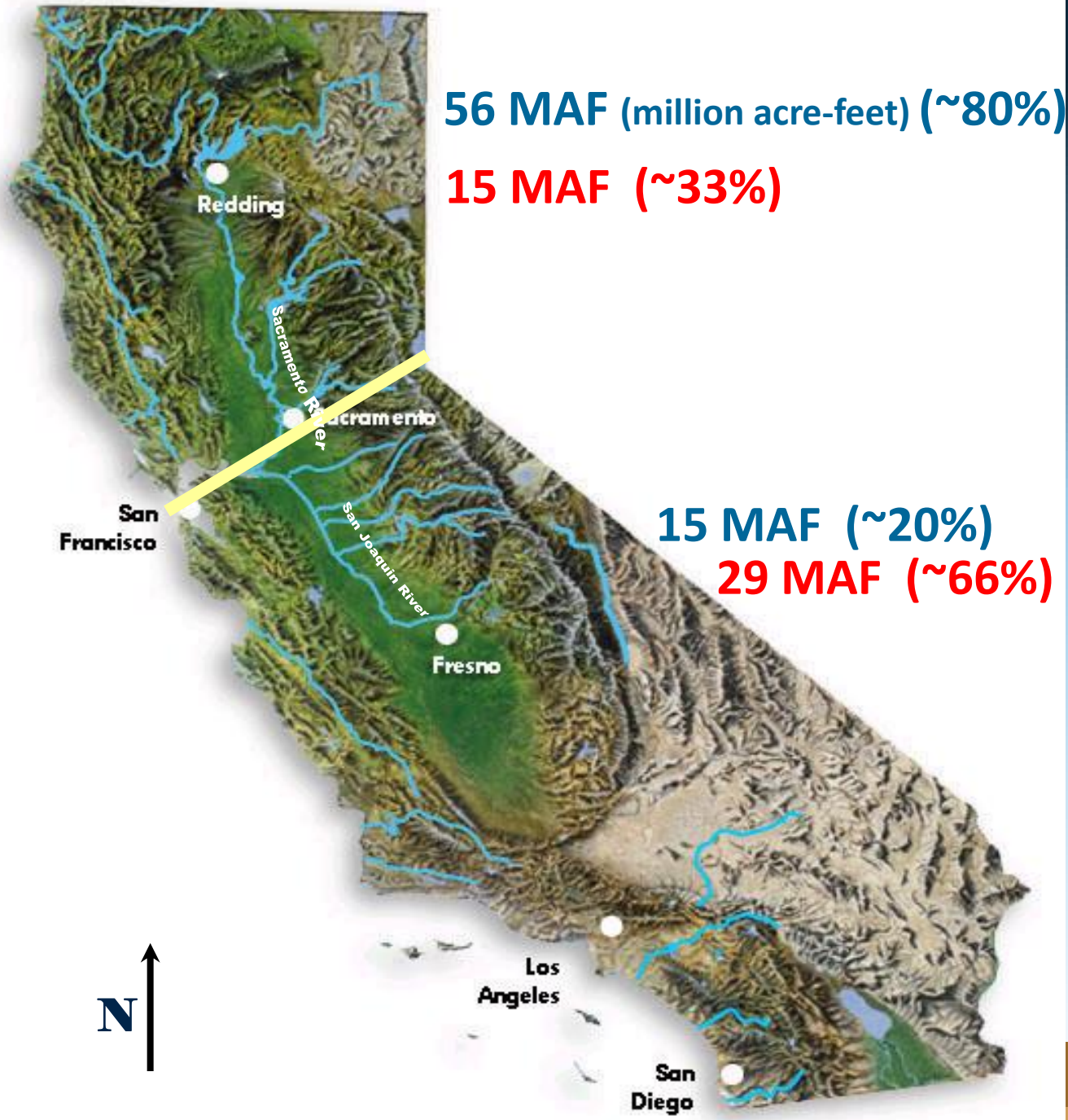
TOO MUCH

Folsom Reservoir, 1976

California Hydrology and Water Use

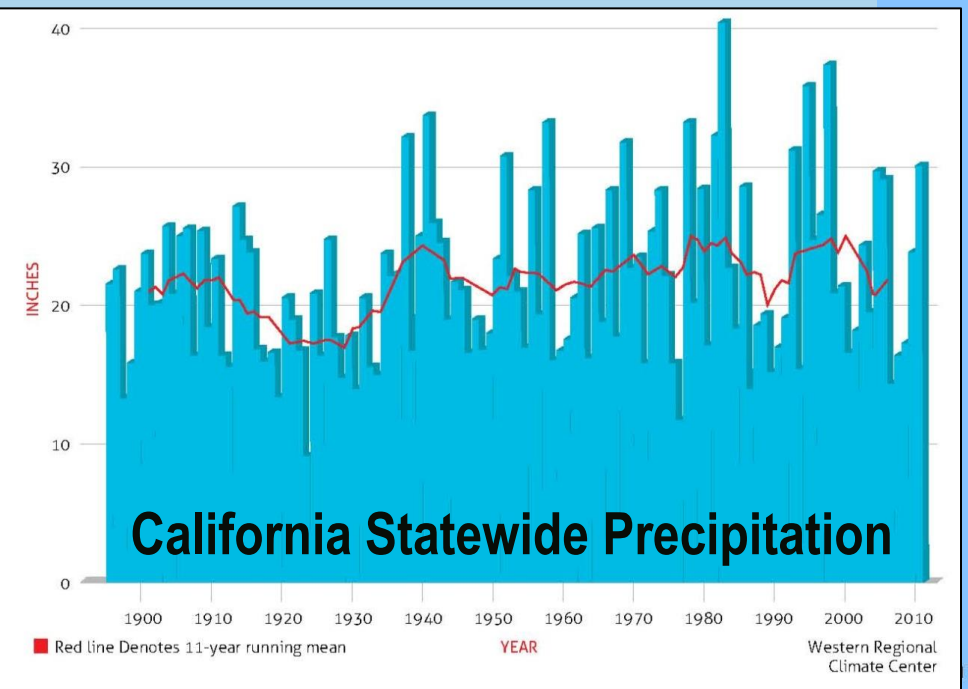
Distribution of Average Runoff (major river systems)

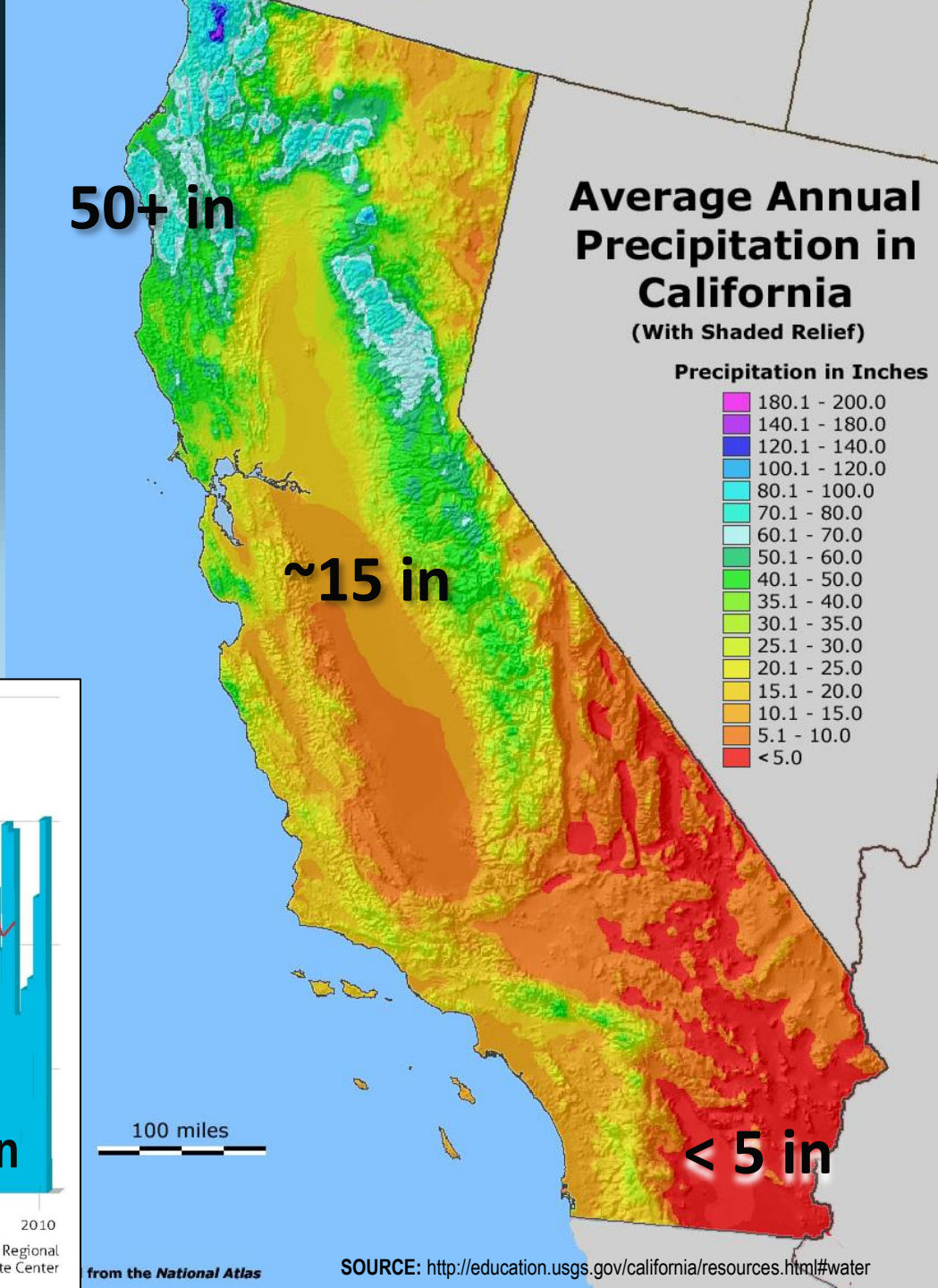
Distribution of Water Use



Precipitation

- Variable and extreme over time and location
- Most precipitation occurs November – March





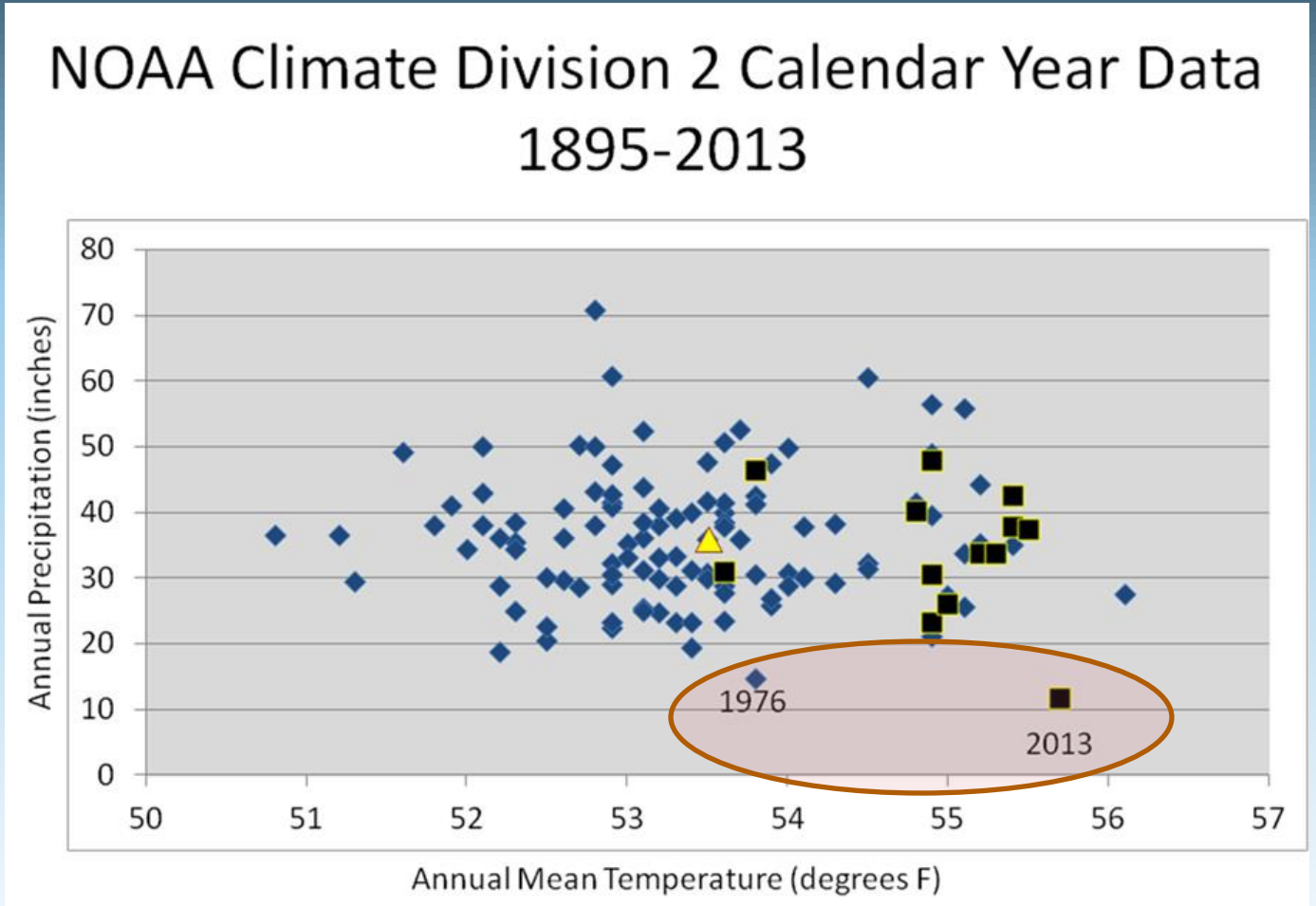
Precipitation and temperature data for 120 years in Sac River watershed

Yellow triangle = period of record average

Black squares = years in the 21st century

Blue triangles = earlier years

Note correlation between 1976 and 2013



Water Year 2014 to Date

- Third dry year – 2013 driest on record
- Statewide unimpaired river runoff: 42% of average (April 1)
- Initial SWP allocation 5% (Nov); revised in January to 0%; revised in April to 5%

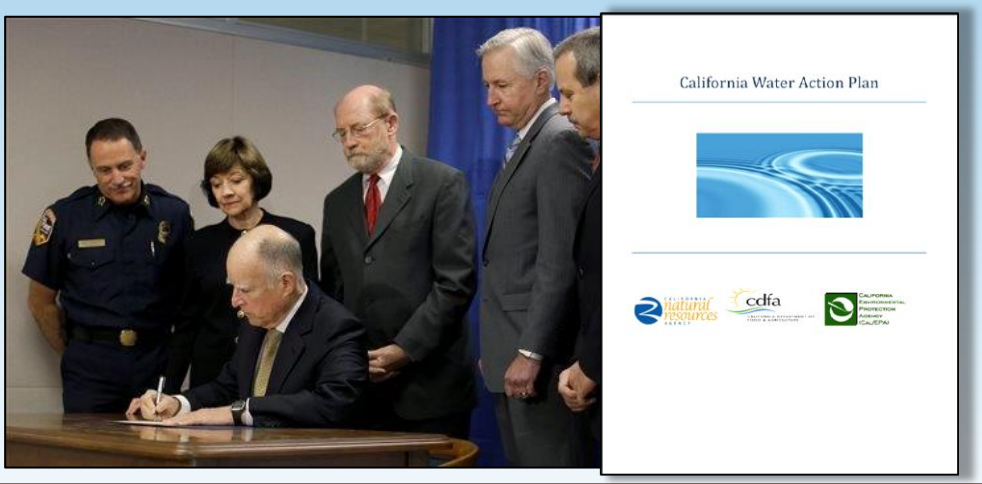
Lake Shasta/I-5 Bridge

Drought Impacts: Greatest Risks

- **Health & safety and economic**
  - Catastrophic wildfires (e.g., Southern California in 2003 and 2007)
- **Health & safety**
  - Impacts to small water systems in rural areas (including wildfire damage)
- **Environmental**
  - Continued San Joaquin Valley land subsidence, spawning beds
- **Economic**
  - Minimal water allocations to some agricultural water users, particularly in the San Joaquin Valley

Drought Impacts: State Actions

- Executive Order B-21-13: Streamline water transfers (May 2013)
- California Water Plan Update (draft Oct 2013)
- Drought Task Force Established (Dec 2013)
- Governor's Drought Proclamation and Water Action Plan (Jan 2014)



Governor's Interagency Drought Task Force

Meets weekly

Established via Governor Brown's December 17th letter to agencies

One week reporting period

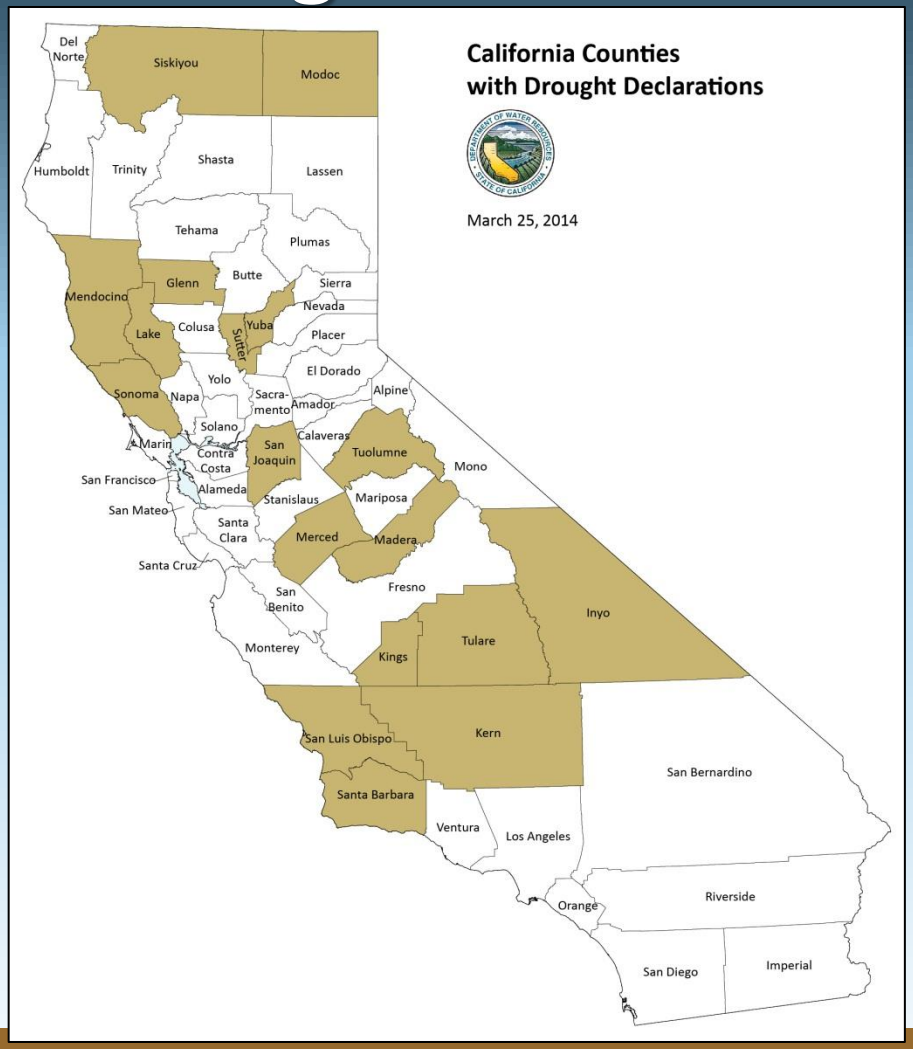
Multiple state agencies involved in addition to above including:

- **Department of Public Health**
- **Employment Development Department**
- **Department of General Services**

Local Drought Task Forces

- Currently, 31 local task forces at the county level
- Association of California Water Agencies (ACWA) has a Drought Action Group that includes many local agency representatives from throughout the state

18 Counties with a State of Emergency due to Drought as of March 26



Voluntary Water Transfers

- **DWR streamlining process**
  - Improving contracting procedures for voluntary transfers dependent on SWP facilities
  - Facilitating fast-tracking of transfers with appropriate supporting documentation
  - Improving coordination and alignment with other agencies SWRCB USBR
  - Updated Web information:

    www.water.ca.gov/watertransfers

Drought Impacts: Tribal Governments in State of Emergency due to Drought

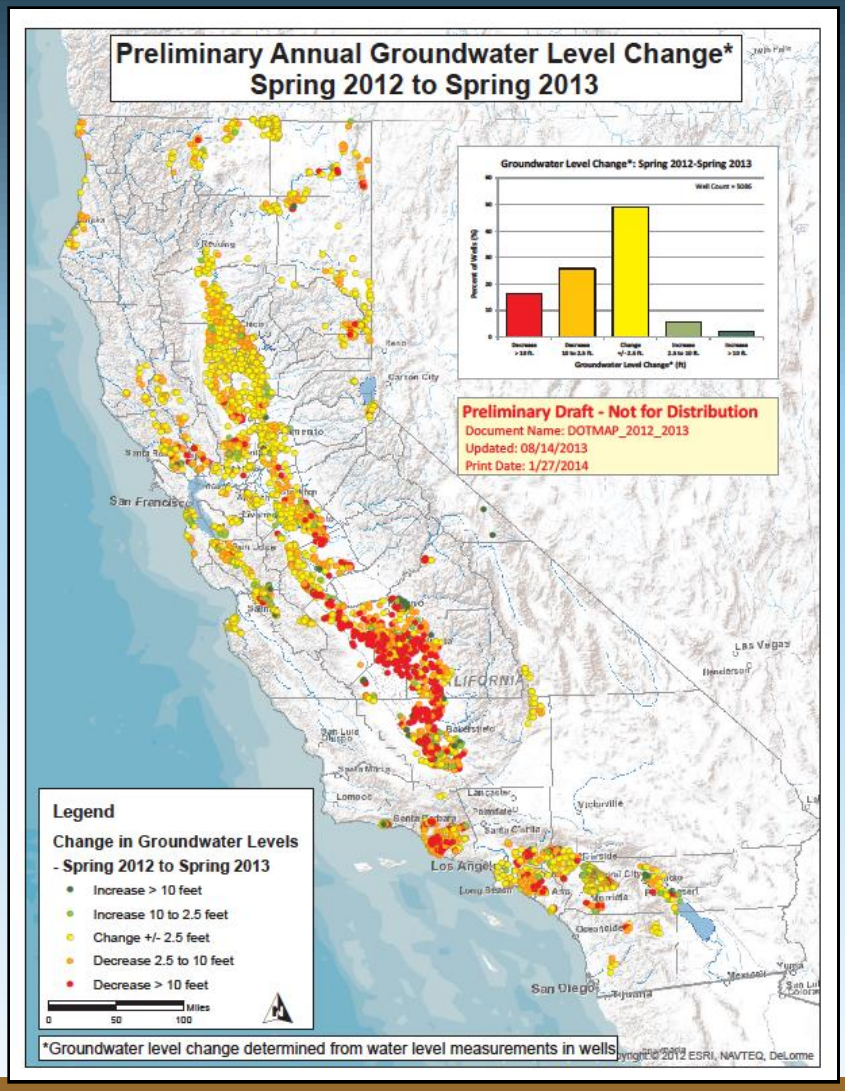
- Hoopa Valley Tribe (Humboldt)
- Yurok Tribe (Del Norte)
- Tule River Tribe (Tulare)
- Karuk Tribe (Siskiyou/Humboldt)
- Sherwood Valley Band of Pomo (Mendocino)

Drought Impacts: Groundwater

- Displays change in groundwater elevation
- One year only 2012-2013

- Red is decrease of more than 10 ft
- Orange is decrease of between 2.5 to 10 ft
- Very little green (increase) on the map

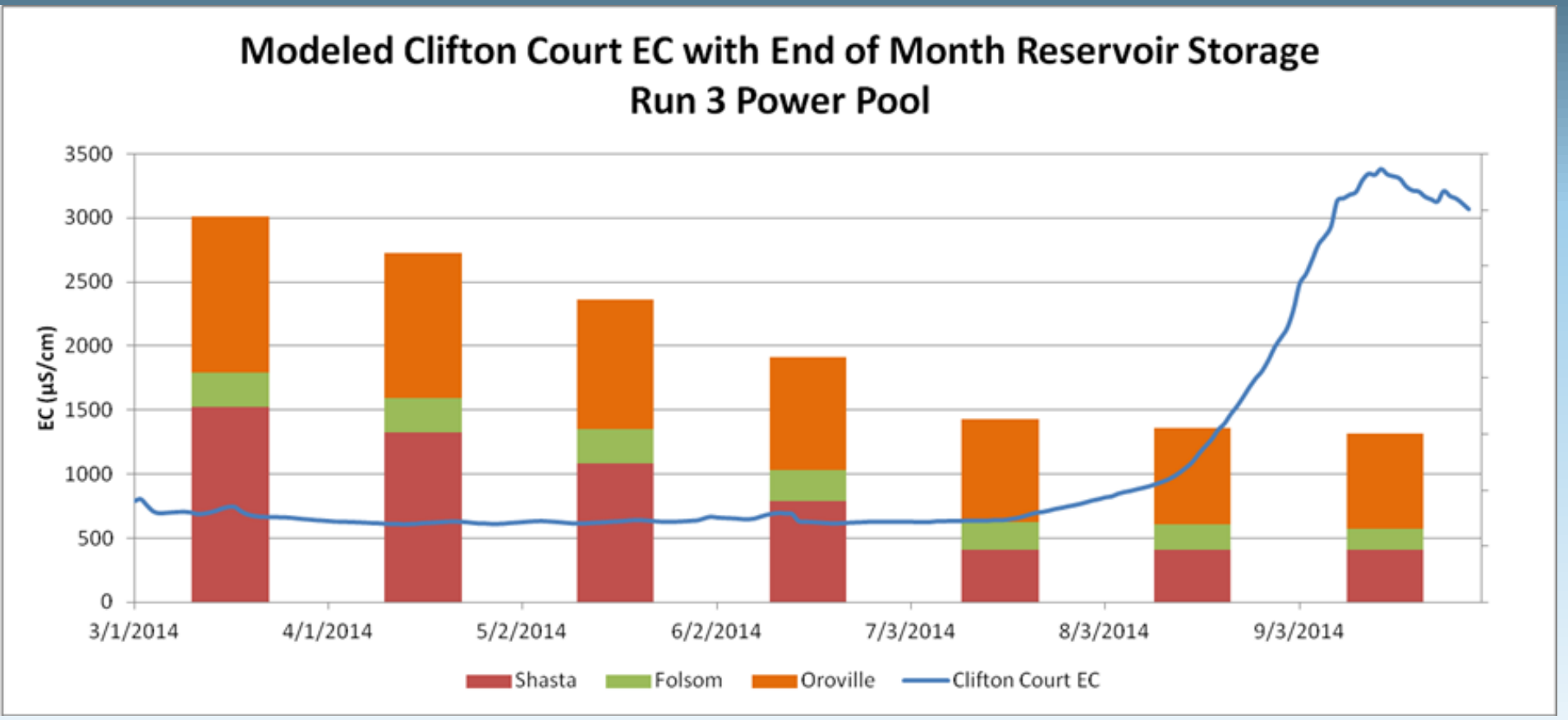
- San Joaquin Valley critical impact
- Contributes to subsidence



Multiple Drought Impacts

- **Reduced surface water**
- **Declining groundwater**
- **Low Reservoir levels**
- **Low snowpack**
- ***Less outflow from Sacramento and San Joaquin Rivers to prevent saltwater from San Francisco Bay from migrating into the Delta***

Meeting Delta Water Quality



Reservoir Storage

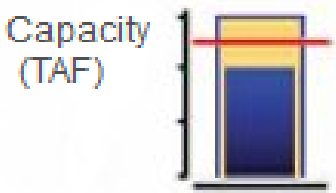
April 21, 2014

LEGEND

Blue Bar: Storage level for date

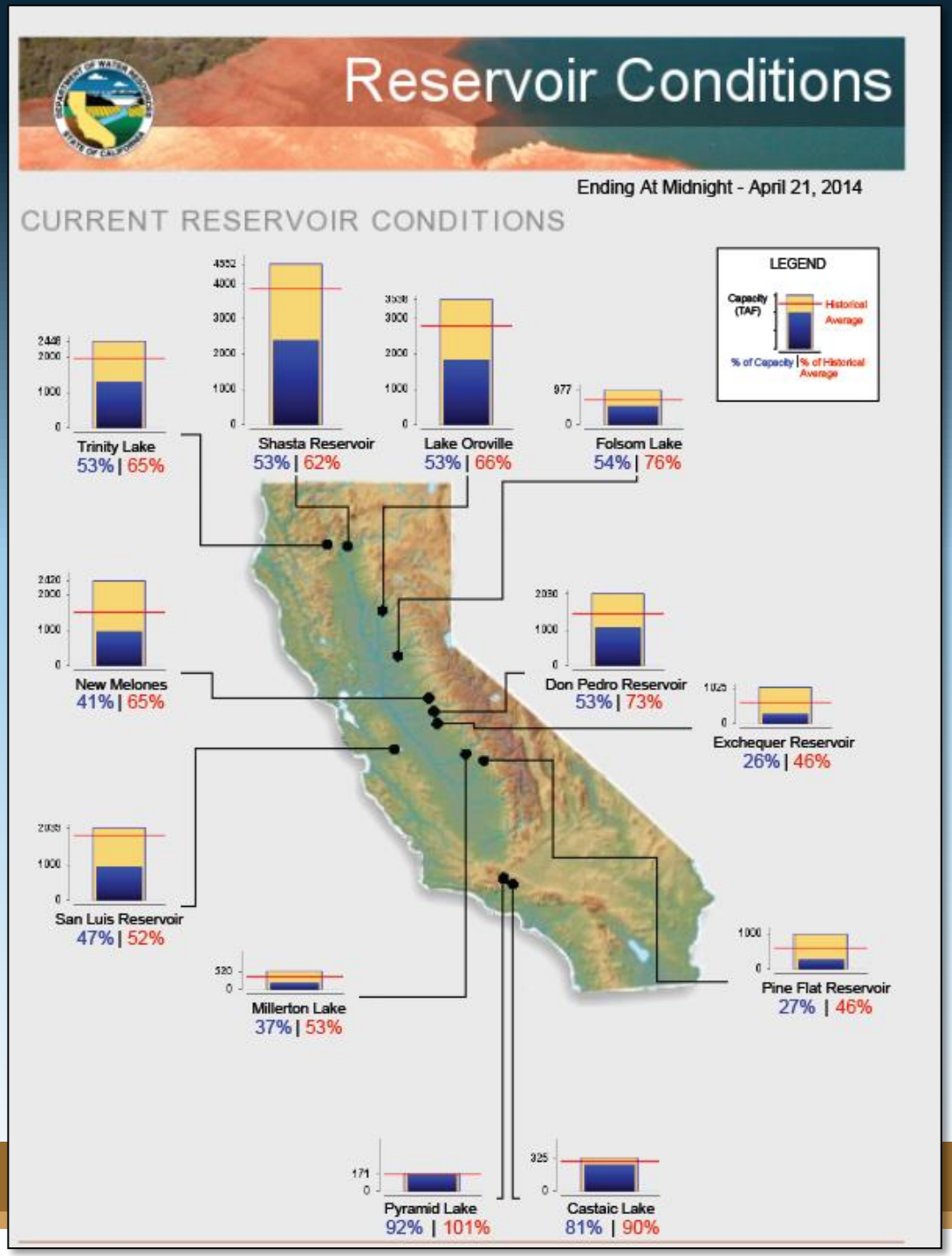
Gold Bar: Total reservoir capacity.

Red Line: Historic level for date.

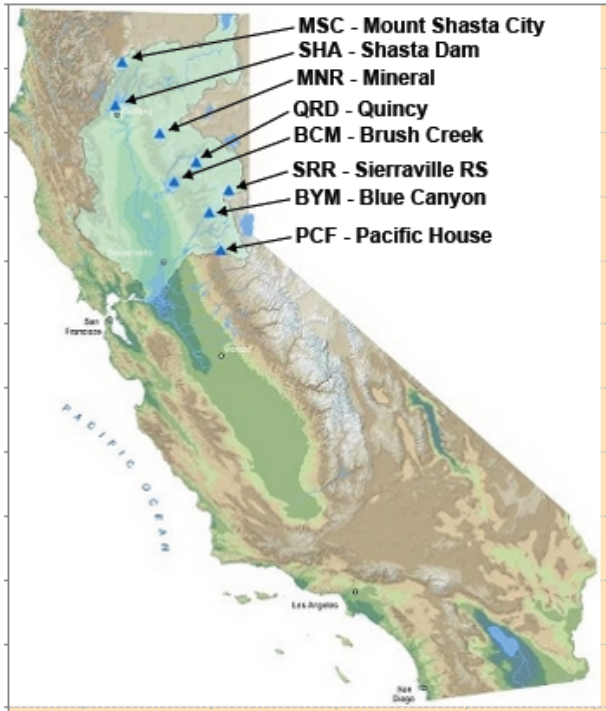


% of Capacity | **% Historical Avg**

(Click reservoir name for details)



Northern Sierra Precipitation: 8-Station Index, April 22, 2014



Percent of Average for this Date: 60%

1982-1983 (wettest) 88.5

2005-2006 Daily Precip. 80.1

Average (1922-1998) 50.0

2012-2013 Daily Precip. 44.3

Current Daily Precip: 26.8

1923-1924 (driest) 17.1

1976-1977 (2nd driest & driest thru Aug) 19.0

Cumulative Daily/Monthly Precipitation (inches)

100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0

Oct 1 Nov 1 Dec 1 Jan 1 Feb 1 Mar 1 Apr 1 May 1 Jun 1 Jul 1 Aug 1 Sep 1 Oct 1

Water Year (October 1 - September 30)

Total Water Year Precipitation

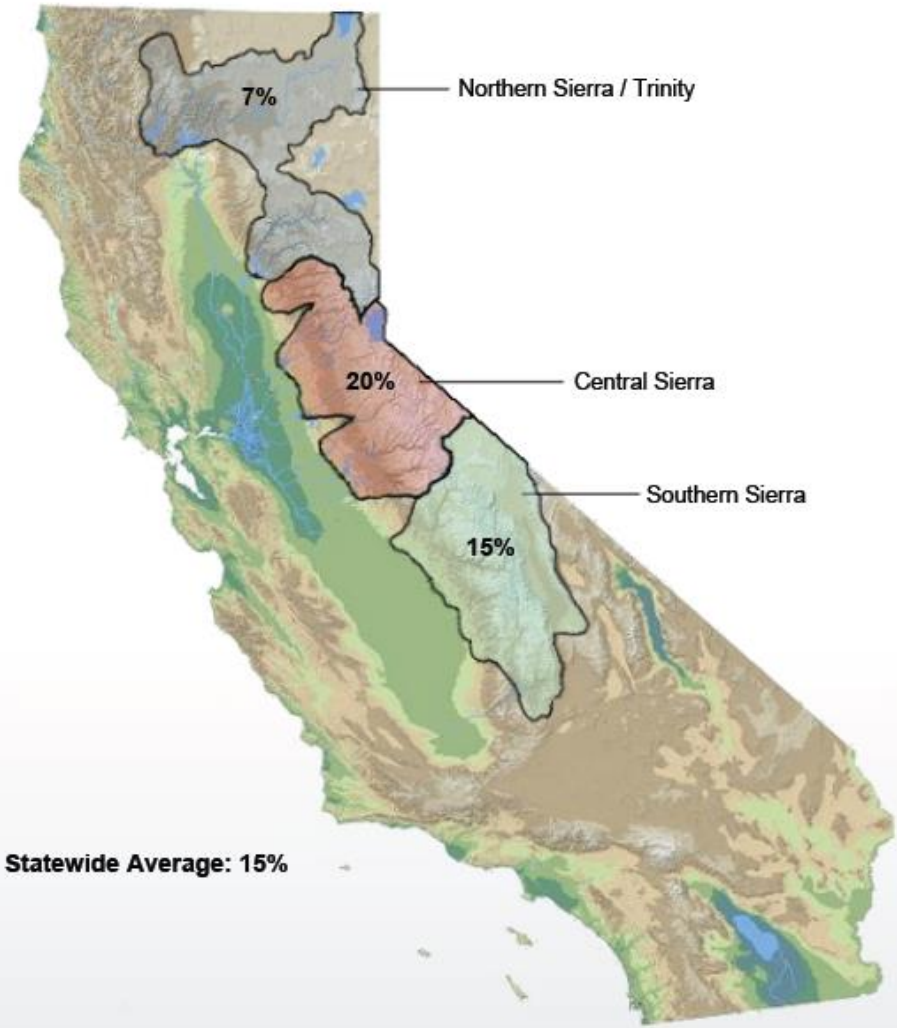
Snow Water Content

April 22, 2014

Statewide Average: 14%

Statewide Summary of Snow Water Content

Current Regional Snowpack from Automated Snow Sensors - % of April 1 Average



Data as of April 22, 2014

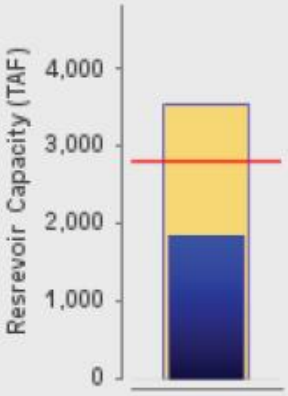
Updated 04/22/2014 01:15 PM

Snow Survey May 1, 2014

Reservoir Conditions - Lake Oroville

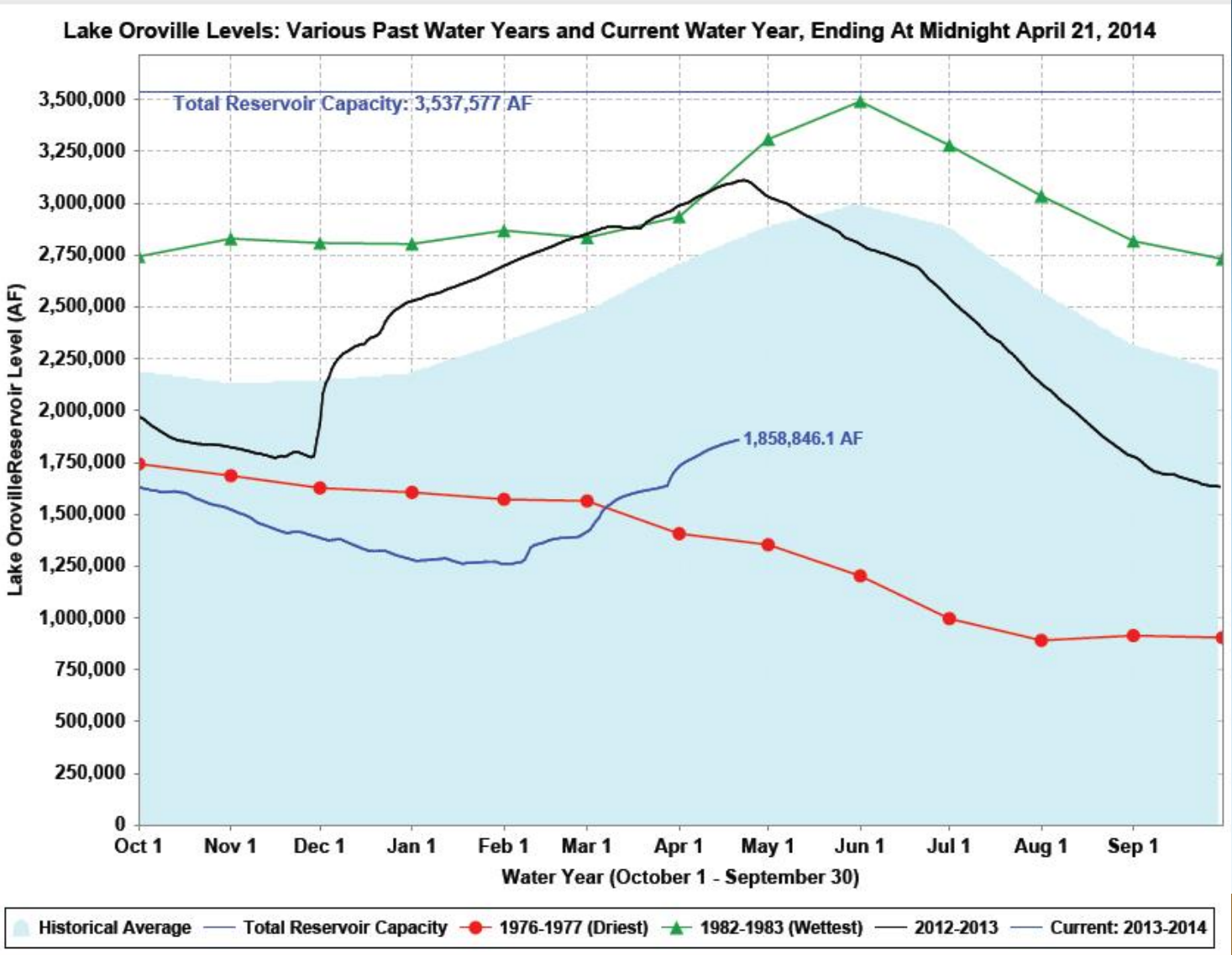
Lake Oroville Conditions

(as of Midnight - April 21, 2014)



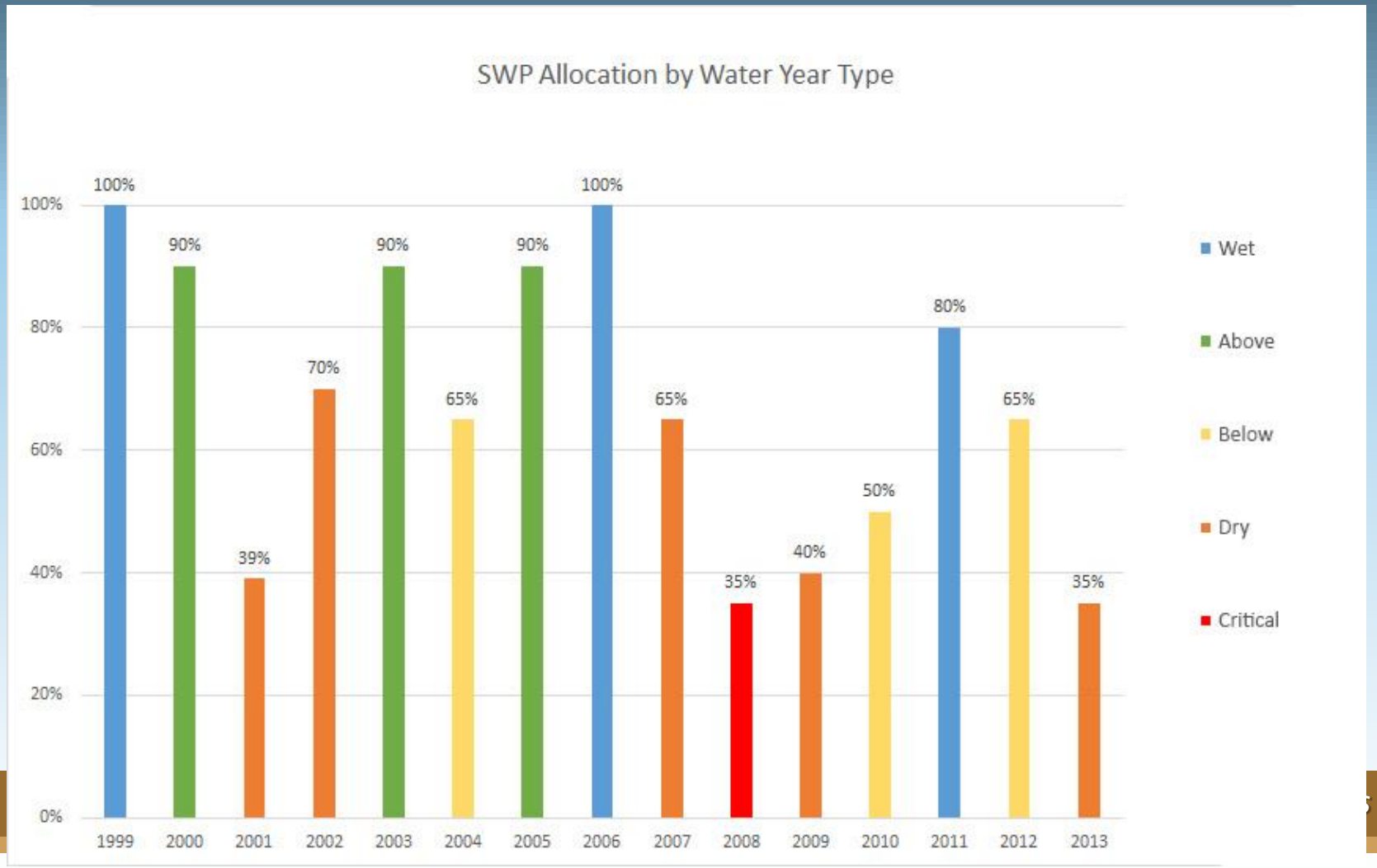
Current Level: 1,858,846.1 AF

53% (Total Capacity) | 66% (Historical Avg.)



Data Updated 04/22/2014 01:45 PM

Impacts of Consecutive Dry Years:
Lower Allocations, Declining Groundwater Levels



Temporary Urgency Change Petition

January – March

- Reduced outflow, conserve upstream storage
- D-1641 modifications, outflow and Delta Cross Channel standards
- Minimal pumping: 1,500 cfs for health & safety
- Zero allocation for 29 public water agencies
- (during March) zero CVP allocations continued; refuges and Sr. Water Right holders along Sac and San Joaquin rivers receive 40%.

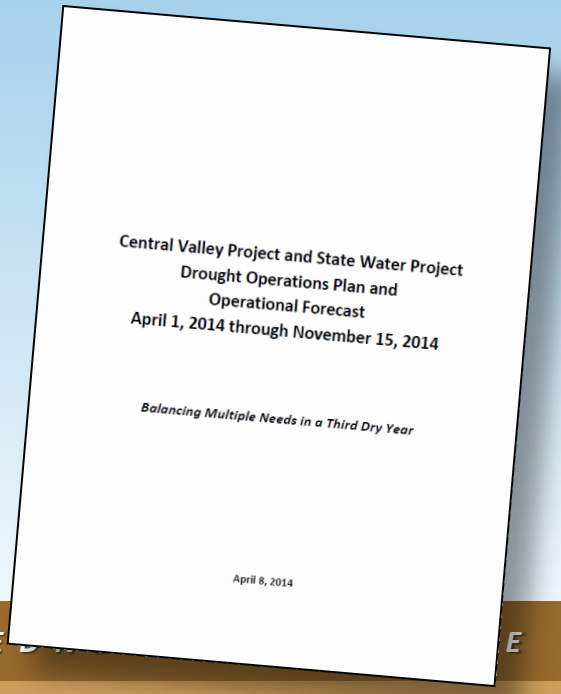
- 4 Amendments Included:
  - Use of I:E ratio of 1:1 for pulse flows
  - Exports up to OMR limits when Delta outflow is 7,100 cfs (3 day avg) or X2 at Collinsville
  - E/I averaging periods for precipitation events

Temporary Urgency Change Petition

Future Operations Include:

- Continue D-1641 flexibility
  - Outflow requirements
  - Threemile Slough salinity
  - Averaging for I:E ratio
  - SJ River pulse flows will comply with D-1641
- Actions of offset impacts to SJ River steelhead and salmon
- DCC gate flexibility, plus additional biological monitoring

- **Projections for Summer 2014** http://ca.gov/drought/2014-Operations-Plan.pdf
- **Drought Barriers**: postponed


Central Valley Project and State Water Project
Drought Operations Plan and
Operational Forecast
April 1, 2014 through November 15, 2014

Balancing Multiple Needs in a Third Dry Year

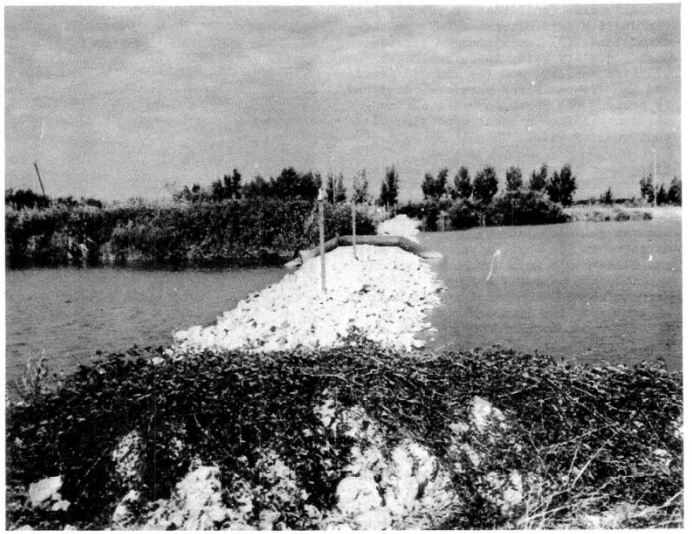
April 8, 2014

1977 Emergency Barriers

- 37 years ago
- California's population was 22 million then.
- In 2014, the population is 38 million.
- The '76-77 barriers helped protect many Delta water users including:
  - Delta farmers
  - City of Antioch
  - City of Tracy
  - Contra Costa Water District

dards even though the modification had as one of its purposes the protection of the Delta against future loss of salinity control because of insufficient upstream storage. Before that suit could be tried, it was necessary for the SWRCB to hold an emergency hearing to deal with the fact that actual hydrologic conditions were very much worse than had been projected. Even under the Interim Plan's modified criteria, Lake Oroville no longer would be able to generate electricity by late summer and would end 1977 only 14 percent filled -- an insufficient amount of storage to protect the Delta if the drought continued into 1978.

In early June 1977, the SWRCB issued an emergency regulation which superseded the Interim Delta Quality Control Plan by temporarily eliminating most water quality standards and limiting SWP exports to unstored water. The regulation was necessary to preserve Oroville storage levels to the greatest extent possible. This emergency regulation was to have terminated no later than December 31, 1977, but with some modifications was extended in mid-December because of continued low reservoir levels.



4. Dams in the Delta. Two barriers, one at Rock Slough (shown) and the other at Indian Slough, actually saved water during the drought. By redirecting fresher water to the Contra Costa Canal Intake, less water had to be released from upstream reservoirs to maintain the same level of water quality.

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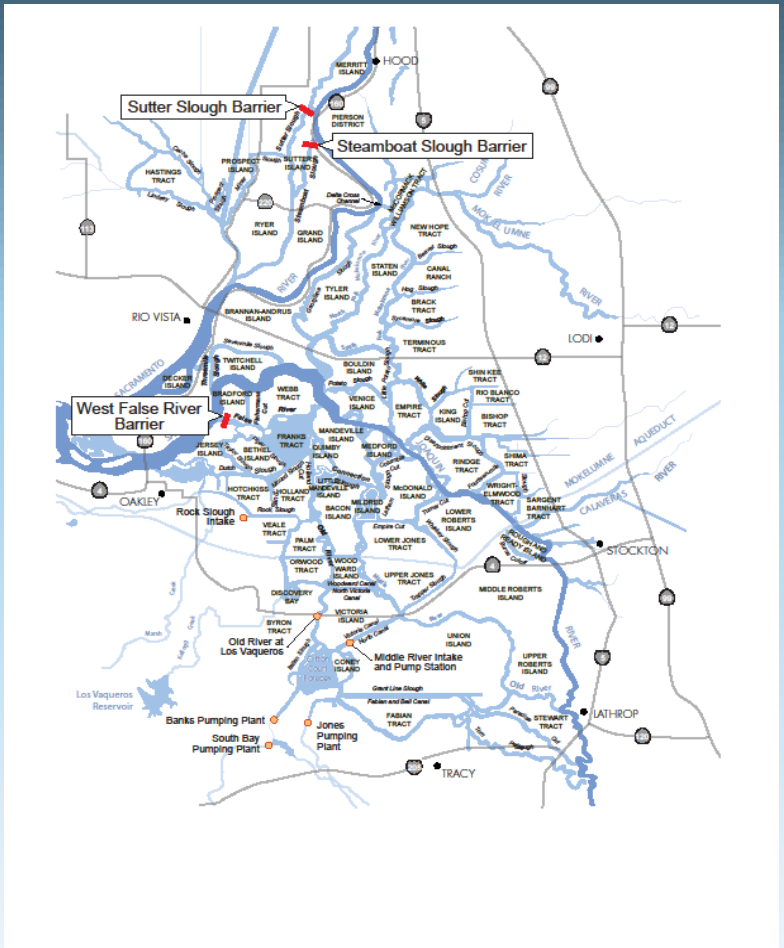
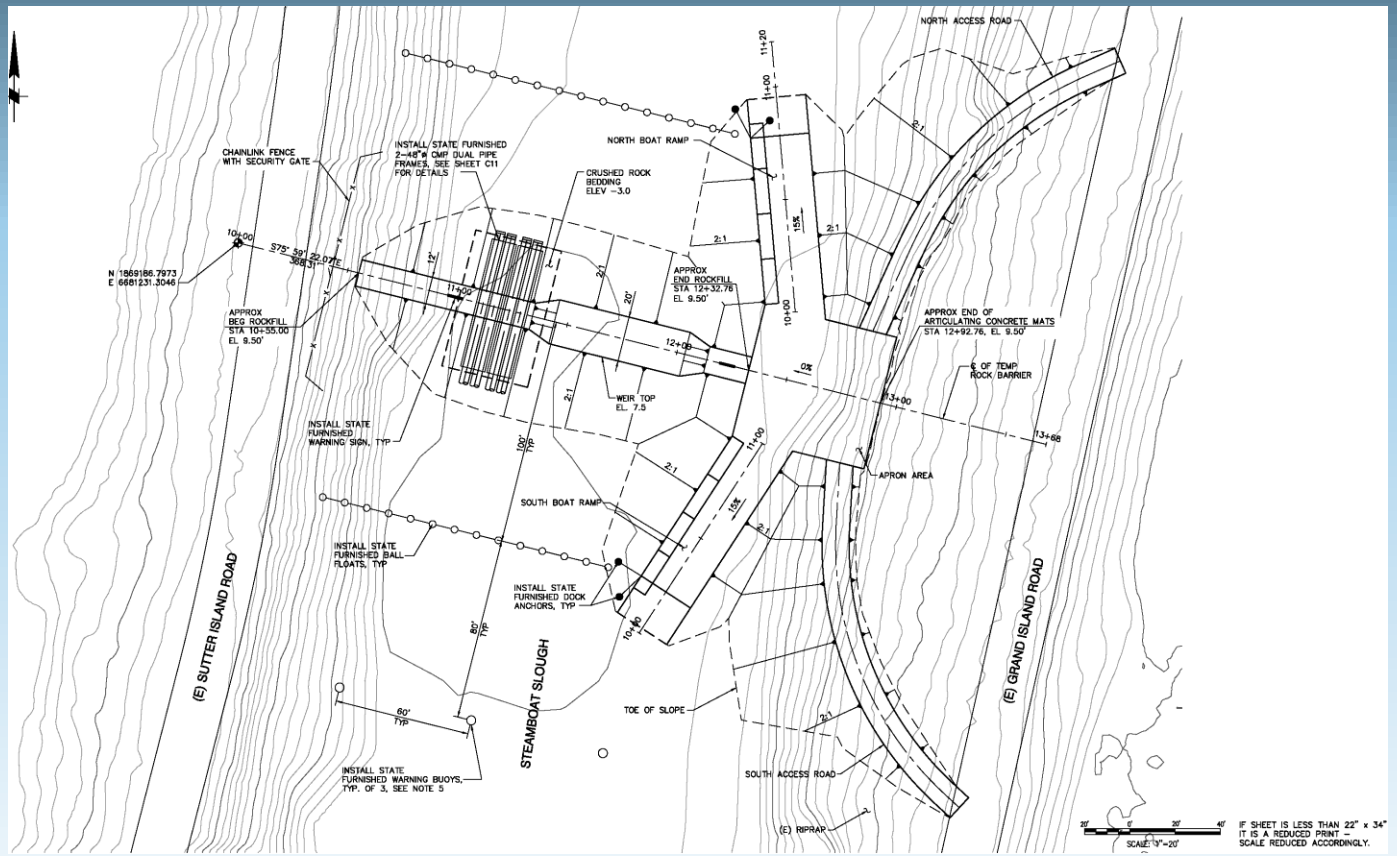
Locations of 2014 Potential Emergency Drought Barriers

- **Temporary rock barriers**
- **Permits required**
- **Agency consultations**
- **Goals:**
  - –Prevent saltwater intrusion
  - –Allow water managers to retain some water in upstream reservoirs for release later in the year



Steamboat Slough Barrier Draft Design



Modernized Design of 2014 Barriers Provides Additional Benefits

- **Operational Flexibility. Sutter and Steamboat Slough barriers are anticipated to have four 48” culverts to allow fish passage and downstream flow for water quality when beneficial.**
- **Steamboat Slough is anticipated to have a boat portage facility to allow passage for boats under 22 feet to cross the barrier.**

Additional Information

Project Factsheet, historical references, and contact information are available at:

www.water.ca.gov/waterconditions/emergencybarriers.cfm